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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/551,587	04/18/2000	Michael L. Bean	LIT3-B113	2462

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EXAMINER	
JUNG, DAVID YIUK	

ART UNIT	PAPER NUMBER
2134	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/551,587	BEAN ET AL.	
	Examiner	Art Unit	
	David Y Jung	2134	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2004*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-4 and 28* is/are allowed.

6)☒ Claim(s) *5-27 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/18/2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Regarding claim 1 (and claims from which they depend) are allowed. The amendments and arguments provide sufficient reasons for the allowance. The other claims are rejected.

In response to applicant's argument that the references must be bodily incorporated into a device (such as at page 8 of the amendment, asking the Office for "greater detail on the combination" and asking whether phase modulator 204 and/or the OOK modulator 208 can be replaced), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Specifically, Applicant is requested to provide further arguments on whether the general teachings of the references (rather than any contemplation of bodily incorporation) would teach the claimed inventions.

Claims Presented

Claims 1-29 are presented for examination.

Claim Rejections - 35 USC 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5-27, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rutledge et al. (EP 0866581A1, cited by Applicant, hereinafter also referred as "Rutledge") and Mazurenko et al. (Spectral coding for secure optical communications using refractive index dispersion, Optical Communications 133 (1997) 87-92, hereinafter also referred as "Mazurenko").

Regarding claim 5, Rutledge teaches "an integrated optics encryption device comprising a multi-functional ... having an input, an output, a message signal input, and a key signal input, and a coherent light source connected to the input of ... (figure 1, e.g., encryption and timing circuitry 100, modulators 204 and 208)."

These passages of Rutledge are not explicit about "integrated optics chip."

Mazurenko teaches "integrated optics chip (Conclusion, e.g., integrated encoding/decoding dispersive systems)" for the motivation of implementing "practical fibre-optics communications."

It would have been obvious at the time of the claimed invention to modify the teachings of these passages of Rutledge and Mazurenko to have such "integrated optics chip" for the motivation noted in the previous paragraphs.

Regarding claim 6, Rutledge teaches "the integrated optics encryption device of Claim 5 where the multi-functional integrated optics chip comprises at least two divergent paths, each path comprising an end (figure 1, e.g., beam splitter 302)."

Regarding claim 7, Mazurenko teaches "the integrated optics encryption device of Claim 6 further comprising a loop connected to the multi-functional integrated optics chip at the end of each path (e.g., increase key complexity when combined with other coherence modulation arrangements)."

Regarding claim 8, Rutledge suggests "the integrated optics encryption device of Claim 6 wherein each end is mirrored (e.g., mirror 306)."

Regarding claim 9, Rutledge teaches "the integrated optics encryption device of Claim 5 where the multi-functional integrated optics chip comprises two divergent paths meeting at a convergent end (figure 1, e.g., divergent beams from beam splitter eventually meeting).

Regarding claim 10, Rutledge teaches "the integrated optics encryption device of Claim 5 where at least one signal generating means is connected to the message signal input and at least one signal generating means is connected to the key signal input (figure 1, e.g., one of the beam from beam splitter eventually sent to decryption and timing circuitry).

Regarding claim 11, Mazurenko teaches "integrated optics encryption device of Claim 5 where the multi-functional integrated optics chip further comprises an encrypted message output (Introduction section, i.e., discussion regarding encoding, decoding, keys, and eavesdropper)."

Regarding claim 12, Mazurenko teaches "the integrated optics encryption device of Claim 6 where the message signal input is connected to one path and can reversibly alter the refractive index of the path to which it is connected and the key signal input is connected to one path and can reversibly alter the refractive index of the path to which it is connected (e.g., Abstract and its note of such use of refractive index handling).

Regarding claim 13, Rutledge teaches "An integrated optics encryption device comprising: a multi-functional ... having an input, an output, a message signal input, a key signal input, and two divergent paths with mirrored ends; a signal generating means connected to the message signal input; a signal generating means connected to the key signal input and a cohererent light source connected to the input of the multi-functional ...; whereby an encrypted message appears at the output based on the message signal input and key signal input (figure 1, e.g., encryption and timing circuitry 100, modulators 204 and 208)."

These passages of Rutledge are not explicit about "integrated optics chip."

Mazurenko teaches "integrated optics chip (Conclusion, e.g., integrated encoding/decoding dispersive systems)" for the motivation of implementing "practical fibre-optics communications."

It would have been obvious at the time of the claimed invention to modify the teachings of these passages of Rutledge and Mazurenko to have such "integrated optics chip" for the motivation noted in the previous paragraphs.

Regarding claim 14, Mazurenko teaches "the integrated optics encryption device of Claim 13 where the message signal input is connected to one path and can reversibly alter the refractive index of the path to which it is connected and the key signal input is connected to the other path and can reversibly alter the refractive index of the path to which it is connected (e.g., Abstract and its note of such use of refractive index handling)."

Regarding claim 15, such "the integrated optics encryption device of Claim 13 where at least one signal generating means connected to the key signal input is a random number generator" are known in the art for the motivation of providing unpredictability in coding.

Regarding claim 16, Rutledge "the integrated optics encryption device of Claim 13 where the coherent light source is a laser (figure 1, e.g., laser 202)."

Regarding claim 17, Rutledge "the integrated optics encryption device of Claim 13 where the coherent light source is a laser diode (figure 1, e.g., laser 202)."

Regarding claim 18, Rutledge teaches "an integrated optics encryption device comprising: a multi-functional ... having an input, a message signal input, a key signal input, and an encrypted message output; means for generating a coherent light signal connected to the input of ...; and means for producing "exclusive or" functionality based on the message signal input and the key signal input (figure 1, e.g., encryption and

timing circuitry 100, modulators 204 and 208, claim 11 -- which notes on/off handling which can handle "exclusive or" functionality)."

These passages of Rutledge are not explicit about "integrated optics chip."

Mazurenko teaches "integrated optics chip (Conclusion, e.g., integrated encoding/decoding dispersive systems)" for the motivation of implementing "practical fibre-optics communications."

It would have been obvious at the time of the claimed invention to modify the teachings of these passages of Rutledge and Mazurenko to have such "integrated optics chip" for the motivation noted in the previous paragraphs.

Regarding claim 19, Rutledge teaches "the integrated optics encryption device of Claim 18 further comprising at least one signal generating means connected to the message signal input and at least one signal generating means connected to the key signal input and where the means for producing >exclusive or= functionality based on the message signal input and the key signal input comprises means for dividing the coherent light signal into two divergent paths with mirrored ends and means for altering a refractive index of the paths (figure 1, e.g., beam splitter 302, mirror 306).

Regarding claim 20, Mazurenko teaches "the integrated optics encryption device of Claim 18 wherein the message signal input further comprises means for reversibly altering a refractive index of one path and wherein the key signal input further comprises means for reversibly altering a refractive index of another path (e.g., Abstract and its note of such use of refractive index handling)."

Regarding claim 21, such "the integrated optics encryption device of Claim 19 wherein at least one signal generating means connected to the key signal input is a random number generator" is well-known in the art for the motivation of providing unpredictability to coding.

Regarding claim 22, Rutledge teaches "a method for encryption using interference from a coherent light source comprising the steps of issuing a coherent light signal from a coherent light source to a multi-functional ... (column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam);
dividing the coherent light signal into two paths within the multi-functional ... (column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam);
issuing pre-determined signals to the two paths of the multi
functional ... where a message signal input is attached to one path of the multi-functional ... and a key signal input is attached to the other path (column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam);
recombining the divided light signal to create an encrypted signal (column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam); and,
outputting the encrypted signal via an encrypted message output (column 2, lines 35 to column 3, line 11, e.g., encryption).

These passages of Rutledge are not explicit about "integrated optics chip."

Mazurenko teaches "integrated optics chip (Conclusion, e.g., integrated encoding/decoding dispersive systems)" for the motivation of implementing "practical fibre-optics communications."

It would have been obvious at the time of the claimed invention to modify the teachings of these passages of Rutledge and Mazurenko to have such "integrated optics chip" for the motivation noted in the previous paragraphs.

Regarding claim 23, Mazurenko teaches "the method of claim 22 where the message signal input and key signal input reversibly alter the refractive index of the path to which each input is connected (e.g., Abstract and its note of such use of refractive index handling)."

Regarding claim 24, such "he method of Claim 22 where the key signal input is connected to a random number generator" is well known in the art for providing unpredictability to coding.

Regarding claim 25, Rutledge teaches "the method of Claim 22 where each path has a mirrored end (Figure 1, e.g., mirror 306)."

Regarding claim 26, Rutledge teaches "a method for decryption using interference from a coherent light source comprising the steps of issuing a coherent light signal from a coherent light source to a multi-functional ... (column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam);

dividing the coherent light signal into two paths within the multi-functional ...(column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam);

issuing pre-determined signals to the two paths of the multi-functional ... where an encrypted message signal input is attached to one path of the multi-functional ... and a key signal input is attached to the other path (column 2, lines 35 to column 3, line 11, e.g., encryption);

recombining the divided light signal to create a message signal (column 2, lines 35 to column 3, line 11, e.g., dual modulation of beam); and,

outputting the message signal via a message signal output (column 2, lines 35 to column 3, line 11, e.g., demodulation).

These passages of Rutledge are not explicit about "integrated optics chip."

Mazurenko teaches "integrated optics chip (Conclusion, e.g., integrated encoding/decoding dispersive systems)" for the motivation of implementing "practical fibre-optics communications."

It would have been obvious at the time of the claimed invention to modify the teachings of these passages of Rutledge and Mazurenko to have such "integrated optics chip" for the motivation noted in the previous paragraphs.

Regarding claims 26 (decryption, etc.), claim 27 (encryption, etc.), such features are well known in the art for the motivation of providing secure communication.

In regard to claim 29, Rutledge teaches "an apparatus comprising: an optical waveguide input; a first optical path having a variable refractive index related to the voltage of a message input; a second optical path having a variable refractive index related to the voltage of a key input; and an optical waveguide output; wherein the optical wave guide input, the first optical path, the second optical path, and optical waveguide output are optically coupled together such that light entering the apparatus via the optical waveguide input is split such that a first portion of the light follows the first optical path and a second portion of the light follows the second optical path, and any of the first portion of the light that passes through the first optical path is combined with

any of the second portion of light that passes through the second optical path and exits the apparatus via the optical waveguide output. (figure 1, e.g., encryption and timing circuitry 100, modulators 204 and 208)."

These passages of Rutledge are not explicit about "refractive index."

Mazurenko teaches "refractive index (figure 1, e.g., interferometers, use of refractive index dispersion as a coding key)" for the motivation of implementing a coding key.

It would have been obvious at the time of the claimed invention to modify the teachings of these passages of Rutledge and Mazurenko to have such "refractive index" for the motivation noted in the previous paragraphs.

Allowable Subject Matter

Claims 1-4, 28 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art does not teach or suggest the particular encrypted message handling with such particular use of controllable refractive index in the particular context of other limitations..

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The art made of record and not relied upon is considered pertinent to applicant's disclosure. The art disclosed general background. They were cited in the previous Office Actions.

Points of Contact

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 746-7238, (for formal communications intended for entry)

Or:

(703) 746-5606 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Jung whose telephone number is (703) 308-5262 or Greg Morse whose telephone number is (703) 308-4789.

David Jung

Primary Examiner

Art Unit 2134

August 23, 2004